

# Exhibit A

Revised – 7/20/2018

## **CURRICULUM VITAE**

PAUL SPENCER FISHMAN, M.D., PH.D.

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University of Maryland School of Medicine  
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Born: November 10, 1949; New York, New York  
Married: Elizabeth Barry  
Children: Leah Beth 4/12/1981, Edwin Barry 1/17/1999, Meyer Joseph 1/17/1999

## **EDUCATION AND TRAINING**

1971	B.A. Johns Hopkins University
1975	Ph.D. (Biology) Yale University
1978	M.D. Johns Hopkins University School of Medicine
1978-1979	Medical Intern, Baltimore City Hospital, and Fellow in Medicine, Johns Hopkins University School of Medicine
1979-1982	Resident, Department of Neurology, Columbia-Presbyterian Medical Center
1982-1983	Fellow, Department of Neurology and Department of Anatomy and Cell Biology, Columbia University College of Physicians and Surgeons

## **CERTIFICATION**

1978	FLEX
1983	Diplomate, American Board of Psychiatry and Neurology

**LICENSURE** Maryland, D0022432

## **MAJOR RESEARCH INTERESTS**

Development of novel therapeutics for neurodegenerative disorders (Parkinson's disease, motor neuron disease, Alzheimer's disease) and CNS injury  
Delivery of protein and cell based therapeutics to the nervous system

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Clostridial toxin action in the nervous system  
Application of therapeutic ultrasound to the nervous system

## **FACULTY POSITIONS**

1983-1988	Medical School Assistant Professor, Department of Neurology, University of Maryland School of Medicine
1988-1991	Assistant Professor, Department of Neurology, University of Maryland School of Medicine
1991-1997	Associate Professor (with tenure), Department of Neurology, University of Maryland School of Medicine
1994-1997	Associate Professor, Department of Anatomy and Neuroscience, University of Maryland School of Medicine (secondary appointment)
1997-present	Professor, Department of Neurology, University of Maryland School of Medicine
1997-present	Professor, Department of Anatomy and Neurobiology, University of Maryland School of Medicine (secondary appointment)
1997-present	Professor, Department of Pharmacology, University of Maryland School of Medicine (secondary appointment)

## **MAJOR ACADEMIC TASKS**

1984-1988	Director, Continuing Education Programs, Department of Neurology
1985-2005	Assistant Chief, Neurology Service, Baltimore VA Medical Center
1989-1990	Acting Chief, Neurology Service, Baltimore VA Medical Center
1989-2005	Director, Program for Neurodegenerative Diseases, Department of Neurology
1992-1994	Associate Director for Neurobiology, Geriatric Research and Education Clinical Center (GRECC), Baltimore VA Medical Center
1996-1999	Chairman, Institutional Review Board (IRB), University of Maryland, Baltimore
2000-2002	Chairman, Neurobiology Review Group, Medical Research, Department of Veterans Affairs
2005- 16	Director of Research, Department of Neurology
2006- Present	Chief, Neurology Service, VA Maryland Health Care System
2010- 13	Chairman, Neurobiology Review Group E, Biomedical and Laboratory Research, Department of Veterans Affairs
2012- 14	Chair, Appointments Promotions and Tenure (APT) Committee, University of Maryland School of Medicine

## **PROFESSIONAL MEMBERSHIP**

AAAS  
American Academy of Neurology  
Society for Neuroscience  
American Neurological Association

## **HONORS AND AWARDS**

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1971 Graduation with General Honors, Johns Hopkins University  
1973 Elected to Sigma Xi - New Haven Chapter  
1981 NINCDS Fellowship in Clinical Neuroscience  
1989 Golden Hammer Award for excellence in Clinical Neurology, Department of Neurology  
1993, 2001 Examiner, American Board of Psychiatry and Neurology  
2002-2004  
1997 Member, American Neurological Association  
1997, 2002, Listed in "Top Docs" Baltimore Magazine, Neurology  
2007  
1998, 2002, Listed in "Best Doctors in America"  
2005-2006, 2007-2008, 2009-2010, 2011-2017  
2011, 2012 Listed in "Super Doctors" for Virginia, DC, Maryland Region  
2013  
2011, 2012 Listed in "Top Doctors" Washington Post Magazine

## **EDITORIAL TASKS**

2000-2012 Editorial Board, Neura  
Reviewer, Neurology  
Reviewer, Journal of the American Medical Association  
Reviewer, Journal of Neuroscience Methods  
Reviewer, Journal of Comparative Neurology  
Reviewer, Lancet  
Reviewer, Journal of Neurosurgery  
Reviewer, Journal of Biological Chemistry,  
Reviewer, Journal of Neurochemistry  
Reviewer, Vaccine  
Reviewer, Journal of Immunology  
Reviewer, Movement Disorders  
Reviewer, Journal of Molecular Medicine  
Reviewer, The Neurologist  
Reviewer, Restorative Neurology and Neuroscience  
Reviewer, Journal of Neurotoxicology  
Reviewer, Human Molecular Genetics  
Reviewer, Brain Structure and Function  
Reviewer, Cell Transplantation  
Reviewer, Proceedings of the National Academy of Sciences  
Reviewer, JAMA Neurology  
Reviewer, Expert Review in Neurotherapeutics

## **SERVICE ACTIVITIES**

1986-1988 Guest Investigator, Armed Forces Institute of Pathology  
1987-1988 Member, Governor's Council on Alzheimer's disease

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1988-1989	Advisory Consultant, Cellular and Molecular Neuroscience Section, National Science Foundation
1989	Advisory Consultant, National Institute on Aging
1996-1998	Consultant, Amgen Corporation, Thousand Oaks, California
1999	Consultant, Chiron Corporation, Emeryville, California
1998	Member, Center for Scientific Review, Special Emphasis Panel on End of Life Research, NIH
2003	Member, Joint NIH/VA Initiative on ALS, Washington, DC
2003	Member, Berry Award Committee, Department of Veterans Affairs
2004	Chair, Berry Award Committee, Department of Veterans Affairs
2006-present	Consultant, FDA Office of Orphan Product Development
2008	Review Committee for Advanced Technology Clinical Awards for Traumatic Brain injury, AIBS and Department of Defense
2009-13	Member, Neurobiology Merit Review Committee, Department of Veterans Affairs
2009	Member, BCDN3 Review Committee, Center for Scientific Review, NIH
2009	Reviewer, Special Emphasis Panel/Scientific Review Group, ZRG1 BDA-A, NIH
2012-present	Member, External Advisory Board VA Mid-Atlantic Epilepsy Center of Excellence
2012-13	Member, F02B: Review Committee, Center for Scientific Review, NIH, Sensory Motor and Cognitive Neuroscience Fellowship
2012-present	Member, ZRG1-ETTN: Review Committee, Center for Scientific Review, NIH, SBIR/STTR for Neurodegenerative Diseases
2013	Site Visit Reviewer, Laboratory of Respiratory and Special Pathogens, Office for Vaccines Research and Review, Center for Biologics Evaluation and Research, FDA
2015-present	Reviewer, Focused Ultrasound Foundation
2015-present	Member, Alzheimer's Disease Steering Committee, Focused Ultrasound Foundation
2016	Member (ad hoc) Board of Scientific Councilors, NINDS
2016-present	Member, Neurobiology Merit Review Committee E, Department of Veterans Affairs
2016	Chair, Search Committee, for Director, VA Multiple Sclerosis Center of Excellence, East
2017-present	Co-Chair Parkinson's Disease Steering Committee, Focused Ultrasound Foundation

## CAMPUS ACTIVITIES

1983-1984	Neuroscience Training Program Committee
1983-1990	Resident Selection Committee, Neurology Department
1984-1985	Pharmacology Peer Review Committee
1984-1985	Representative, Medical School Council, Neurology Department
1985-1986	Task Force on Student Examination and Evaluation

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1985-1991	Short Term Research Training Program (Chairman, Neuroscience Section, 1989-1991)
1986-1988	Chancellor's Task Force on Aging, GGEAR Program (Committee on Alzheimer's Disease)
1986-1991	Research and Development Committee, Baltimore VAMC
1986-1987	Histology Peer Review Committee
1988-1989	Behavioral Sciences Peer Review Committee
1989-1999	M.D./Ph.D. Program Committee
1990-1992	Medical Staff Quality Assurance Committee, Baltimore VAMC
1990-1992	Ethics Committee, Baltimore VAMC
1990-1999	Medical Education Advisory Committee
1990-1992	Pharmacy Committee, University of Maryland Hospital
1990-1991	Physiology Peer Review Committee
1992-1999	Institutional Review Board (IRB)
1992-1995	Advisory Board, VA Eastern Regional Development Office
1994	Chairman, Ambulatory Care and Preventive Medicine Peer Review Committee
1994-2001	Interviewer, Admissions Committee, University of Maryland School of Medicine
1996-1999	Chairman, Institutional Review Board (IRB), University of Maryland, Baltimore
1998-2004	Neuroscience Development Committee
2000-2003	Member, GCRC Advisory Committee
2004-2010	Chair, GCRC Advisory Committee
2002	Member, Middleton Award Committee, Medical Research Department of Veterans Affairs
2003-2004	Member, Patient Safety Committee, Baltimore, VAMC
2004	Chair, Search Committee for ACOS for Research and Development, Baltimore, VAMC
2002-2003	Executive Committee, Faculty Assembly, University of Maryland School of Medicine
2003-2005	Vice Chair, Faculty Assembly, University of Maryland School of Medicine
2004-2005	Member-at-Large, Medical Executive Committee, University of Maryland Hospital
2004-07	Member, Faculty Senate, University of Maryland, Baltimore
2006-09	Search Committee for Chair of Internal Medicine, University of Maryland School of Medicine
2006	Chair, Neuromuscular Division Director Search Committee
2006-07	Member, Search Committee, Chief of Mental Health Services Maryland VAHCS
2006- 13	Chair, Appointments Promotions and Tenure Committee, Department of Neurology
2007-present	Member Residency Oversight Committee, Department of Neurology
2009-present	Founding Member, Embryonic Stem Cell Research Oversight Committee
2009- 12	Chair, Epilepsy Division Director Search Committee
2009-present	Founding Member, University of Maryland Center for Stem Cell Biology and Regenerative Medicine
2010- 15	Member, Appointments Promotions and Tenure (APT) Committee, University of Maryland School of Medicine
2010-present	Departmental Reviewer for Human Research

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2011	Chair, Working Group for VA Animal Research
2011-16	Member, Faculty Senate, University of Maryland, Baltimore
2012- 16	Faculty Representative, Executive Committee, School of Medicine
2015	Member, SOM Committee for Evaluation of the Director, Maryland Psychiatric Research Center
2015	Member, Committee for Criteria for Clinical Excellence, School of Medicine
2016	Member, Center of Excellence for Focused Ultrasound, University of Maryland School of Medicine

## OUTSIDE ACTIVITIES

1989	Walkathon Vice Chairman, Alzheimer's Society
1986-1988	Secretary-Treasurer, Maryland Neurological Society
1988-1990	Vice President, Maryland Neurological Society
1990-1992	President, Maryland Neurological Society
1994-2000	Board of Directors, Alzheimer's Association of Central Maryland
1995-present	Member and Founding Chairman (1995-2000), Medical and Scientific Advisory Board, Alzheimer's Association of Central Maryland
1996-1998	Vice President, Alzheimer's Association of Central Maryland
2000-2002	President, Dembeigh Hill HOA
2016-present	Board or Directors, Dembeigh Hill HOA

## TEACHING RESPONSIBILITIES

### Basic Sciences

1984-1993	Neurosciences I Clinical Correlatives on Parkinson's Disease and Alzheimer's Disease Small group session on Neurodegenerative Diseases
1984-1999	Mini-mester Elective on Neurological Diseases of Unknown Cause
1984-present	Neuroscience Journal Club
1987-2002	Pharmacology I, Clinical Correlative on Movement Disorders
1991-1993	Neurosciences I, Physiology of the Basal Ganglia, Supra-segmental Motor Control
1993-1995	Pathology II, Neuropathology of Toxic and Metabolic Disease
1994-2010	Pathology II, Pathology of Neurodegenerative Disease
1995-2010	Dementia, Physiology of Aging, School of Nursing
2001	Co-Chair, Program in Neuroscience 4 <sup>th</sup> Annual Symposium "Molecular Biology of Neurodegeneration"
2003-present	Alzheimer's disease, Epidemiology of Aging
2003-2006	Director, Breakfast Seminar "Mechanisms of Neurodegeneration as Targets for Therapy" at the Annual Meeting of the American Academy of Neurology
2004	Faculty, Workshop in Spasticity and Dystonia, American Academy of Neurology, Baltimore, MD
2007-2008	Director, Dinner Seminar "Developing Neuroprotective Therapies" at the Annual Meeting of the American Academy of Neurology
2016	Molecules to Medicine MD/PhD Seminar Series "Deep Brain Stimulation"



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### Clinical Sciences

1983-present	Sophomore Physical Diagnosis - The Neurological Examination
1983-present	Attending Neurologist on the Neurology Inpatient and Consult Services, University of Maryland Hospital and Baltimore VAMC
1983-present	Neurology Residents Lecture Series (Altered Mental Status, Dementia, Alzheimer's Disease, Non-Alzheimer's Dementias, Rapidly Progressive Dementias, Movement Disorder Emergencies, Surgical Treatment of Movement Disorders, Normal Pressure Hydrocephalus)
1987- 2010	Morning Report, Department of Neurology
1988-2010	Neurology Residents Journal Club
2014-present	Psychiatry Resident Lectures on Parkinson's disease, Atypical Parkinsonism

### Laboratory Trainees

1985-1986	Jennifer Gass, MSII, STRTP Trainee
1986	Hinda Dubin, MSII
1987	Joseph Savitt, MSI, STRTP Trainee
1988	Matthew Kramer, MSII, STRTP Trainee
1989	Lisa Wolfe, MSII, STRTP Trainee, M.D./Ph.D. Program
1990	Amal Mattu, MSII
1992	Edward McDaniel, MSII, STRTR Trainee
1993	Patrick Wynnyk, MSIV
1992-1994	Xiao Feng Zhang, Postdoctoral Fellow
1993-1995	Jonathan Francis, Ph.D., Pre-doctoral Student
1995-1996	Anil Patwardhan, Graduate Student in Neuroscience
1996-1998	Christopher Matthews, Ph.D., Postdoctoral Fellow
1996-1998	Dayse Figuieredo, Ph.D., Postdoctoral Fellow
1998	Kristen Park, Summer Student
1999	Michael Box, Ph.D., Pre-Doctoral Student
1999-2003	Yien Che Tsai, Ph.D., Pre-Doctoral Student
2002	Kelly Mills, MSI
2002-2007	Kirsten Messmer, Ph.D., Post-Doctoral Fellow
2001-2005	Samir Jafri, Ph.D., Post-Doctoral Fellow
2003-2005	Frank Skidmore, M.D., Post-Doctoral Fellow
2003-2004	Terry Shum, Pre-Doctoral Student
2004	Randall Rief, Summer Student
2005	Chelsea Barrow, Summer Student
2006	Lisa Einhorn, Summer Student
2006-09	Michael Gillmeister, Ph.D, Pre-Doctoral Student
2006-09	Rosemary Schuh, Ph.D., Post-Doctoral Fellow
2008- 2013	Manfred Schubert, Ph. D., Visiting Scientist (N.I.H.)
2008	Emily Chen, Graduate Student
2009-11	Claire Ciarkowski MSI Student
2010-11	Brian Brown, UMBC Student
2011- 15	Paul Gramlich, Pre-Doctoral Student



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2011	Julian Amin, UMCP Summer Student
2012	Tyler Demarest, Graduate Student
2012	Adam Zhao, Summer Student
2013	Amanda Labuza, Graduate Student
2013-16	Nicholas Mello, Graduate Student
2013	Nina Klimova, Graduate Student
2013	Paige Studlach, Graduate Student
2012-15	Kathleen Gilpin, Dissertation Committee Member
2014	Tien Duong, MD, PhD Student
2014	Eryn Dixon, Graduate Student
2014-16	Joseph Thomas, Dissertation Committee Member
2014-present	Cameron Lassiter, Dissertation Committee Member

## GRANT SUPPORT

### Principal Investigator

1983-1984	Veterans Administration, Associate Investigator Award "Regeneration of the Corticospinal Tract" \$72,000 (direct costs).
1983-1984	Frank C. Bressler Research Fund "Transplantation into Glial Toxin Treated Spinal Cords" \$4,800.
1984-1985	Frank C. Bressler Research Fund "Corticospinal Degeneration in Human Disease" \$3,000.
1985-1988	Veterans Administration, Merit Review Grant "Viral Encephalitis Involving the Basal Ganglia" \$105,000 (direct costs).
1987-1988	UMAB Special Research Initiative "Role of Transsynaptic Uptake in Motoneuron Disease" \$9,700.
1988-1991	Veterans Administration, Merit Review Grant "Synaptic Uptake in Motoneuron Disease" \$145,000 (direct costs).
1990-1991	Smith, Kline and French Laboratories "Oxiracetam for the Treatment of Dementia of the Alzheimer Type" (Site Principal Investigator as part of a multicenter study) \$60,000 (direct and indirect site costs).
1990-1991	Smith, Kline and French Laboratories "Safety and Efficacy of Long Term Use of Oxiracetam in Alzheimer's Disease".
1990-1992	Hoechst-Roussel Pharmaceuticals "Long Term Tolerance and Safety Study of Velnacrine Maleate in Patients with Alzheimer's Disease". \$42,000 (direct and indirect costs).
1991-1992	Heavy Equipment DRIF Award, University of Maryland at Baltimore, "Rapid Magnetic Stimulator." \$18,000.
1991-1992	Frank C. Bressler Research Fund "Interaction of Cortical Projection Neurons with Transplanted Fetal Cortex". \$9,300.
1992-1994	Veterans Administration Research Advisory Group Award "Influence of Trophic Factors in Injury to Aged Cerebral Cortex." \$80,000.
1992-1994	Parke Davis Laboratories

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	"Treatment IND for Cognex (Tacrine HCl) in Patients with Alzheimer's Disease."
1992-1994	SmithKline Beacham Pharmaceuticals "Ropinirole in Early Parkinsonian Patients Not Receiving Dopaminergic Therapy." \$54,000.
1992-1994	Smithkline Beacham Pharmaceuticals "Ropinirole as Adjunctive Therapy in Patients Not Optimally Controlled on L-Dopa." \$58,000.
1993-1995	Glaxo Research Institute "Ondansetron in the Treatment of Alzheimer-type Dementia." \$55,000.
1994-1996	Miles Laboratories "Metrifonate in Patients with Probable Alzheimer's Disease." \$219,000.
1995-1998	Department of Veterans Affairs Research Service, Merit Review Grant "Regeneration of Cortical Pyramidal Cells." \$305,000
1995-1998	Department of Veterans Affairs, Research Training Initiative "Synaptogenesis by Human Neurons Derived from Cell Lines." \$180,000 (Co-PI with C. M Tang)
1995-2000	NIA "Tetanus Toxin C-Fragment/SOD Hybrid as a Neuroprotectant." \$590,140 (direct) Project 3 of Program Project "Superoxide Dismutase in Aging and Neurodegeneration". 1 PO1 AG12992-01 (R. H. Brown, Jr., P.I.)
1996-1998	Hoechst-Marion-Roussel Pharmaceuticals "Propentofylline in Patients with Alzheimer's Disease." \$72,000
1996-1998	Hoechst-Marion Roussel Pharmaceuticals "Propentofylline in Patients with Vascular Dementia." \$72,000
1997-2000	Eisai Pharmaceuticals "Donepezil in Vascular Dementia." \$55,000
1998-2000	Eisai Pharmaceuticals "Donepezil in Parkinsonian Dementia." \$90,000
1998-2003	Department of Veterans Affairs Research Service, Merit Review Grant "Neuronal Vectors from Clostridial Neurotoxins." \$620,000
1999-2004	Department of Veterans Affairs, Research Enhancement Award Program (REAP) "Mechanisms of Neuronal Degeneration." \$1,090,000
2000-2002	ALS Association "Enzyme Protection of Motor neurons from Glutamate, \$109,000.
2001-2003	NINDS 5R21-NS1660-02. "Motor Neuron Protection through Glutamate Degradation" \$297,000,
2001-2002	Society for Progressive Supranuclear Palsy "Interaction of Parkin Protein with Abnormal Forms of Tau", \$40,000.
2002-2003	Benign Essential Blepharospasm Research Foundation "Permanent Motor Denervation with a Tetanus-Diphtheria Hybrid Neurotoxin" \$58,000
2003-2008	Department of Veterans Affairs Research Service, Merit Review Grant, "Delivery of Therapeutic Proteins to the CNS" \$650,000.
2005-2009	Department of Veterans Affairs – Research Enhancement Award Program (REAP) Novel Therapeutic Strategies for Neurodegenerative Diseases" \$1,340,000.

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2007-2009	State of Maryland Stem Cell Initiative "Transcription Factor Directed Differentiation of Neural Progenitor Cells" \$230,000
2008-2012	Department of Veterans Affairs Research Service, Merit Review Grant, "Tetanus Toxin as a Potential Therapeutic" \$540,000.
2009-2014	Department of Veterans Affairs, Rehabilitation Research and Development – Research Enhancement Award Program (REAP), "Biologic Therapeutics to Restore Nervous System Function", \$1,850,000
2010-2011	Allergan Educational Grant Fellowship in Neurotoxin Therapeutics, \$20,000
2012-2014	Department of Veterans Affairs, Biomedical and Laboratory Research and Development Pilot Project Award "Dopaminergic transcription factor delivery to fibroblast derived neurons" \$175,000
2013	Department of Veterans Affairs, Shared Equipment Research Program (SHEP) "MRI Guided Focused High Intensity Ultrasound Small Animal System" \$190, 000
2015-2016	Focused Ultrasound Surgery Foundation "Enhancement of FUS Mediated Delivery of Stem Cells to Brain." \$100,000
2015	Gift of Atom and Nancy Giannopoulos "FUS Mediatized Stem Cell Delivery to the Brain" \$25,000
2016-2018	Department of Veterans Affairs, Biomedical and Laboratory Research and Development Pilot Project Award "Enhancing Cell Delivery for Parkinson's Disease" \$203,000
2016	Focused Ultrasound Surgery Foundation/Gift of Mr. John Madigan "FUS Enhancement of Intra-Nasal Delivery of Stem Cells to Brain." \$25,000

#### Co-Investigator

1991-1993	Army Research Office "Toxin-Mediated Transfer and Expression of Genes in Nerve Cells." \$100,000 Gregory Mueller, Principal Investigator
1994-1996	National Institute of Aging Energy Metabolism in Alzheimer's Disease." \$297,000 Eric Poehlman, Principal Investigator
1997-1998	Guilford Pharmaceuticals "DOPAC in Diagnosis of Early Parkinson's Disease." \$60,000 Selma Kahn, M.D., Principal Investigator
1998-2001	Wellcome Trust Biomedical Research Collaboration Grant (Travel). "Cell Binding and Retrograde Transport of Tetanus Toxin." \$20,000 Neil Fairweather, Ph.D., Principal Investigator
2000-2003	Department of Veterans Affairs "Targeted Delivery of Enzymes to Decrease Neuronal Death" \$327,000 Christopher Matthews, Principal Investigator
2002-2004	NINDS

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	“Neuroprotective Mechanisms of Parkin” \$365,000, George Oyler, Principal Investigator
2004-2007	Department of Veterans Affairs “Neuroprotection by Targeted Delivery of Glutamate Degrading Enzymes” \$592,000 Christopher Matthews, Principal Investigator
2004-2008	Department of Veterans Affairs, “Early Nerve Terminal Dysfunction in Dopaminergic Neurodegeneration” \$355,000 Samir Jafri, Principal Investigator
2004-2009	NIEHS “Domoic Acid Neurotoxicity in Native Americans” Lynne Grattan, Principal Investigator
2008-2011	Department of Veterans Affairs, “Tetanus Toxin for Disuse Muscle Atrophy” \$610,000 Christopher Matthews, Principal Investigator
2009-2012	Department of Veterans Affairs, “Synergy of Mitochondrial Mechanisms in Toxic Neurodegeneration” \$420,000 Rosemary Schuh, Principal Investigator
2011-2013	Maryland Stem Cell Research Fund “Stem Cell Therapy for Traumatic Brain.” \$230,000 Paul Yarowsky, Principal Investigator
2012-2014	Department of Veterans Affairs, “Targeted migration of stem cells to improve cellular therapy after TBI.” \$200,000 Paul Yarowsky, Principal Investigator
2014-present	Insightec, “ExAblate in the treatment of essential tremor, a placebo controlled study” \$300,000 Howard Eisenberg, Principal Investigator
2015-present	Insightec, “ExAblate in the treatment of essential tremor, open labeled treatment” \$300,000 Howard Eisenberg, Principal Investigator
2015-present	Insightec, MJ Fox Foundation “A phase I clinical trial of the management of medical-refractory motor symptoms of advanced idiopathic Parkinson’s disease with unilateral lesioning of the globus pallidum using ExAblate transcranial system.” \$200,000 Howard Eisenberg, Principal Investigator
2017-2021	National Institute of Health “Functional MRI Biomarkers Predicting Cognitive Progression in PD” \$478,000 Brenda Hanna-Pladdy, Principal Investigator
2018-present	Insightec, “A pivotal clinical trial of the management of medically-refractory motor dyskinesia symptoms or motor fluctuation of advanced idiopathic Parkinson’s disease with unilateral lesioning of the globus pallidum using ExAblate transcranial system.” \$325,000 Howard Eisenberg, Principal Investigator

Consultant

1991-1999	National Institute of Aging "Epidemiology of Dementia in Aged Nursing Home Admissions." Jay Magaziner, Principal Investigator
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2002-2005	NINDS “A Simple Neuroprotection Trial in Parkinson’s Disease” Lisa Shulman, Principal Investigator
2005-2010	NINDS Non-Viral Delivery of Neurotrophic Factor to the CNS Jonathan W. Francis, Principal Investigator
2009-2011	Maryland Stem Cell Initiative Targeting Stem Cells in the CNS with External Magnetic Fields Paul Yarowsky, Principal Investigator
2010-2012	Maryland Stem Cell Research Fund "Combinatorial RNAi Strategy for Neural Cell Replacement in the Post-ischemic Brain" Tibor Kristian, Principal Investigator

## **PUBLICATIONS**

### **Book Chapters and Invited Reviews**

- 1) Fishman PS: A study of dendritic form in identified lamprey neurons. Ph.D. Dissertation, Yale University, 1975. Portions printed in: Bulletin of the Neuroscience Research Program, 17:106-109, 1979. and in: Simple Networks in Behavior. Fentress JC, Ed., Sinaur, Sunderland, Mass., 1976, pp. 45-50.
- 2) Fishman PS: Neural transplantation. In: Methods in Animal Experimentation, Vol. 5, Heavner JC, Gay WI, Eds. Academic Press, Orlando, Florida, 1989, pp. 171-205.
- 3) Panitch HS, Vriesendorp F, Fishman PS: Neurologic diseases. In: Basic and Clinical Immunology, Stites DP, Ed. Appleton-Lange, San Mateo, CA, 1991, pp. 552-563 (7th Edition); 1994, pp. 507-519 (8th Edition).
- 4) Drachman DB, Fishman PS, Rothstein JD, Motomura M, Lang B, Vincent A, Mellits Ed: Amyotrophic Lateral Sclerosis: An Autoimmune Disease II. In: Amyotrophic Lateral Sclerosis: Pathogenesis and Treatment, Munsat TL and Serratrice G., Eds. Raven Press, 1995, pp. 59-68.
- 5) Silver KA, Fishman PS. Movement Disorders. In: Rehabilitation Medicine Secrets, O'Young B, Young MA, Stiens SA, Eds. Mosby, St. Louis, 1977, pp. 270-276.
- 6) Fishman PS. Paroxysmal dystonias. In: Current Treatment Options in Neurology, Vol 3, Movement Disorders, Weiner WJ, Ed Current Science Inc, Philadelphia PA. 2001 PP 519-525.
- 7) Fishman PS. Neuronal delivery vectors derived from tetanus toxin. In: Scientific and Therapeutic Aspects of Botulinum Toxin, Brin M., Jankovic J, Hallet M, Eds, Lippincott, Williams and Wilkins, Baltimore, MD 2002 pp 485-493.
- 8) Fishman PS, Oyler GA. Significance of the Parkin gene and protein in understanding Parkinson’s Disease. Neurology and Neuroscience Reports, 2002;2(4) 296-302.
- 9) Fishman PS. Common disorders of movement: Tremor and Parkinson’s Disease. In: Principles of Ambulatory Medicine, Sixth Edition, Barkder LR, Burton JR, Zieve PD, et al. Eds, Lippincott, Williams and Wilkins, Baltimore, MD 2003 pp 1431-1443

- 10) Fishman PS. Common disorders of movement: Tremor and Parkinson's Disease. In: Principles of Ambulatory Medicine, Seventh Edition, Feibach NH, Kern DE, Thomas PA, Zeigelstein Eds. Lippincott Williams and Wilkins, Philadelphia PA 2007 pp 1554-1568
- 11) Fishman PS. "Seizing the Moment" An assessment of current research and treatment of Alzheimer's disease. Baltimore Sun, June 16, 2004 pg 15A.
- 12) Fishman PS, Animal models of Parkinson's Disease. In: Parkinson's Disease: Diagnosis and Clinical Management, Second Edition, Factor SA and Weiner WJ Eds. Demos, New York 2008 pp329-340
- 13) Fishman PS, "Should EMG be Used Routinely in the Treatment of Dystonia? Yes" in Moving Along, (Newsletter of the Movement Disorders Society) Vol. 9, Issue 2. Summer/Fall 2007.
- 14) Silver KA, Fishman PS. Movement Disorders. In: Rehabilitation Medicine Secrets, O'Young B, Young MA, Stiens SA, Eds. Mosby, St. Louis, 3rd Ed., 2007, pp. 466-477.
- 15) Fishman PS, Tetanus toxin. In: Botulinum Toxin: Therapeutic Clinical Practice and Science, Jankovik J, Albanese A, Atassi MZ, Dolly JO, Hallett M, Eds. Elsevier, Philadelphia, 2009 pp 406-424
- 16) Fishman PS, CBD: Some Answers. In: A Guide for People Living with PSP and CBD. Society for PSP (CurePSP) 2010
- 17) Fishman PS, The Promotions and Tenure Process, The Faculty Voice (University of Maryland Baltimore) May, 2013
- 18) Fishman PS, Minimally Invasive Brain Intervention: What all the FUS is About. Practical Neurology 2017

### **Journal Articles - Refereed**

- 1) Fishman PS, Nilaver G, Kelly JP: Astrogliosis limits the integration of peripheral nerve grafts into the spinal cord. Brain Res 277:175-180, 1983.
- 2) Fishman PS, Kelly JP: Fate of severed corticospinal axons. Neurology 34:1161-1167, 1984.
- 3) Fishman PS, Kelly JP: Identified central axons differ in their response to spinal cord transection. Brain Res 305:152-156, 1984.
- 4) Bernard PA, Rance NE, Fishman PS, Max SR: Neural control of cytosolic androgen receptor in rat skeletal muscle. J Neurochem 43:1479-1483, 1984.
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### **Abstracts**

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## **BOOK REVIEW**

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## **PATENTS AWARDED**

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## **INVITED PRESENTATIONS**

"Dendritic Morphology of Lamprey Mueller Cells." Eastern Neuroscience Society, Washington,  
DC, April, 1983.  
"Changes in Dendritic Structure during Development and Regeneration of Identified Neurons of  
the Lamprey Brain." American Society of Physiology, Albany, NY, May, 1974.  
"Regeneration of Severed Spinal Tracts." Neurology Grand Rounds, University of Maryland,  
Baltimore, MD, June, 1983.  
"Corticospinal Degeneration in Amyotrophic Lateral Sclerosis." American Academy of  
Neurology, Boston, MA, April, 1984.  
"Histology Techniques in Experimental Pathology." National Society for Histotechnology,  
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"Coronavirus Encephalitis Involving the Basal Ganglia." Department of Microbiology, University  
of Pennsylvania, Philadelphia, PA, December, 1984.  
"Parkinsonism." Maryland Academy of Family Physicians, Easton, MD, March, 1985.  
"Parkinson's Disease." Grand Rounds, Perry Point VAMC, Perryville, MD, July, 1985.  
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"Pathology of Neural Transplantation." Department of Neuropathology, Armed Forces Institute  
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- "Causes and Treatments of Parkinson's Disease." Delaware Psychiatric Society, Wilmington, DE, November, 1985.
- "Neurodegenerative Disease." M.D./Ph.D. Program, University of Maryland, Baltimore, MD, December, 1985.
- "Parkinson's Disease." Medical Grand Rounds, University of Maryland, Baltimore, MD, February, 1986.
- "Treatment of Parkinson's Disease." Sandoz Symposium on Parkinson's Disease, Baltimore, MD, March, 1986.
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- "Upper Motor Neuron Disease in ALS." Neurology Grand Rounds, Thomas Jefferson University, Philadelphia, PA, April, 1986.
- "Pharmacotherapy of Brain Injury." Annual Meeting of the American Association for the Advancement of Science, Philadelphia, PA, May, 1986.
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- "Transsynaptic Uptake in Motoneuron Disease." Neurology Grand Rounds, New Jersey Medical School, Newark, NJ, January, 1987.
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- "Diagnosis and Management of Motor Neuron Disease." Medical Grand Rounds, Baltimore VAMC, Baltimore, MD, February, 1987.
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- "Update on Parkinsonism." Neurology Grand Rounds, George Washington University Medical Center, Washington, DC, March, 1987.
- "Etiology and Treatment of Parkinson's Disease." Neurology Grand Rounds, Washington VAMC, Washington, DC, April, 1987.
- "Parkinson's Disease." Neurology and Music at Maryland Program, Baltimore, MD, February, 1988.
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- "Management of the Patient with Parkinson's Disease." Baltimore County Department of Aging, Baltimore, MD, February, 1990.
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- "Current Concepts of Parkinson's Disease." Department of Health and Mental Hygiene, State of Maryland, September, 1990.
- "Treatment of Spinal Cord Injury." Fidia Pharmaceutical Corporation, Washington, DC, November, 1990.
- "Parkinson's Disease and Aging." Division of General Internal Medicine and Geriatrics, University of Maryland, Baltimore, MD, January, 1991.
- "Current Treatment of Parkinson's Disease." Department of Family Medicine, University of Maryland, Baltimore, MD, March, 1991.
- "Understanding Alzheimer's Disease - Implications for Diagnosis." Medical and Chirurgical Faculty of Maryland, Baltimore, MD, May, 1991.
- "Diagnosis and Treatment of Parkinson's Disease." Grand Rounds, Kent and Queen Anne Hospital, Chestertown, MD, May, 1991.
- "Psychiatric Aspects of Parkinson's Disease." Grand Rounds, Spring Grove State Hospital, Catonsville, MD, June, 1991.
- "Environmental Toxins and Neurodegenerative Disease." Grand Rounds, Peninsula General Hospital, Salisbury, MD, August, 1991.
- "Dementia with Parkinson's Disease." Maryland Gerontological Association Annual Meeting, October, 1991.
- "Understanding Alzheimer's Disease." WLIF Radio, Baltimore, MD, November, 1991.
- "What is Alzheimer's Disease?" WPOC Radio, Baltimore, MD, November, 1991.
- "What's New in Research on Alzheimer's Disease." Annual Symposium of the Alzheimer's Disease Association (Maryland Chapter), November, 1991.
- "Paraneoplastic Syndromes." Neuroimmunology Symposium, University of Maryland, Baltimore, MD, November, 1991.
- "Environmental Toxins and Neurological Disease." Grand Rounds, Harford Community Hospital, Havre de Grace, Maryland, March, 1992.
- "Effects of Systemic Cancer on the Nervous System." Medical Grand Rounds, Baltimore VAMC, Baltimore, MD, June, 1992.
- "Current Understanding of Alzheimer's Disease." Neurology Grand Rounds, National Naval Medical Center, Bethesda, MD, June, 1992.
- "Focus on Alzheimer's Disease." WBAL TV, Baltimore, MD, June, 1992.
- "Aging and Alzheimer's Disease." Rosemont Seniors Center, Baltimore, MD, August, 1992.
- "Diagnosis and Treatment of Alzheimer's Disease." Grand Rounds, John F. Kennedy Medical Center, NJ, March, 1993.
- "Magnetic Stimulation of the Nervous System." Department of Biomedical Engineering, Johns Hopkins Medical School, Baltimore, MD, March, 1993.
- "Update on Alzheimer's Disease." Grand Rounds, Hunterdon Medical Center, NJ, March, 1993.
- "Recent Progress in ALS and Huntington's Disease." WBAL Radio, Baltimore, MD, May, 1993.
- "Current Management of Alzheimer's Disease." Grand Rounds, Malcolm Grow Medical Center, Washington, D.C., August, 1993.
- "Tacrine in the Treatment of Alzheimer's Disease." WMAR TV, Baltimore, MD, September, 1993.
- "Neurologic Aspects of Alzheimer's Disease." Maryland Gerontological Association, October, 1993.
- "Management of Patients with Alzheimer's Disease." Peninsula General Hospital, Salisbury, MD, October, 1993.

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- "Therapeutic Strategies in Alzheimer's Disease." Grand Rounds, Thomas Jefferson University Hospital, Philadelphia, PA, January, 1994.
- "Treatment of Alzheimer's Disease." WCBM Radio, Baltimore, MD, June, 1994.
- "Movement Disorders in the Elderly." Grand Rounds, Holy Cross Medical Center, Silver Springs, MD, June, 1994.
- "Alzheimer's Disease." WEA Radio, Baltimore, MD, September, 1994.
- "Acute Management of Dementia." Maryland Society of Emergency Room Nurses, October, 1994.
- "Understanding Alzheimer's Disease." WLIF Radio, Baltimore, MD, February, 1995.
- "Medical Management of Alzheimer's Disease." Grand Rounds, Franklin Square Hospital, Baltimore, MD, April, 1995.
- "Management of Parkinson's Disease." Conference on Therapeutic Dilemmas in the Geriatric Patient, University of Maryland School of Pharmacy, Baltimore, MD, April, 1995.
- "Recent Progress in Alzheimer's Disease." Grand Rounds, Southern Maryland Hospital Center, Clinton, MD, June, 1995.
- "Early Diagnosis of Parkinson's Disease." WBAL TV, Baltimore, MD, July, 1995.
- "Management of Alzheimer's Disease." Grand Rounds, Welbourne Medical Center, Evansville, IN, July, 1995.
- "Alzheimer's Disease." WBFF TV, Baltimore, MD, August, 1995.
- "Molecular Delivery Systems for Neurological Disease." Grand Rounds, Department of Neurology, University of Maryland Hospital, Baltimore, MD, December, 1995.
- "Treatment of Parkinson's Disease." St. Agnes Medical Center, Baltimore, MD, January, 1996.
- "Management of Parkinson's Disease." Topics in Rehabilitation, Baltimore, MD, February, 1996.
- "Early Diagnosis of Alzheimer's Disease." WMAR TV, Baltimore, MD, March, 1996.
- "What's New in Alzheimer's Research." Dilemmas in Dementia Symposium, Baltimore VA Medical Center, Baltimore, MD, March, 1996.
- "Clostridial Toxin Based Vectors for Protein Delivery to the Nervous System." Institute for Neurobiology, San Juan, P.R., April, 1996.
- "Tremors." Annual Family Medicine Review Course, Ocean City, MD, June, 1996.
- "Dementia and Its Management." WCBM Radio, Baltimore, MD, September, 1996.
- "Diagnosis and Treatment of Parkinson's Disease." Grand Rounds, Kernan Hospital, Baltimore, MD, September, 1996.
- "Progress in Alzheimer's Disease." Grand Rounds, Holy Cross Hospital, Silver Spring, MD, January, 1997.
- "Diagnosis and Treatment of Alzheimer's Disease." Grand Rounds, Franklin Square Hospital, Baltimore, MD, January, 1997.
- "Treatment of Alzheimer's Disease." Grand Rounds, Perry Point VAMC, Perryville, MD, March, 1997.
- "Diagnosis and Treatment of Alzheimer's Disease." Grand Rounds, Wyman Park Hospital, Baltimore, MD, March, 1997.
- "Dementia." St. Joseph's Hospital, Baltimore, MD, March, 1997.
- "Tetanus Toxin Fragments as a Delivery System to Neurons." Neurex Corporation, Menlo Park, CA, April, 1997.
- "Consent for Emergency Research." WJZ TV, Baltimore, MD, April, 1997.
- "Recent Developments in Alzheimer's Disease." WJHU Radio, Mark Steiner Show, Baltimore, MD, April, 1997.

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- "Fragment C Compared to Tetanux Toxin as a Vector for Neuronal Delivery." Second International Meeting on the Molecular Genetics and Pathogenesis of Clostridia, Onzain, France, June, 1997.
- "Neuroscience Research and Native American Art." IDEA TV. Brazil, December, 1997.
- "Research Update on Alzheimer's Disease." Maryland Gerontological Society, Baltimore, MD, December, 1997.
- "Alzheimer's Disease." WEAE Radio, Baltimore, MD, January, 1998.
- "Diagnostic Tests for Alzheimer's Disease." Maryland Neurological Society, Baltimore, MD, February, 1998.
- "Mechanisms of Neurodegenerative Diseases." Peter Lamy Memorial Symposium, Baltimore, MD, April, 1998.
- "Update on Parkinson's Disease." Grand Rounds, St. Joseph's Hospital, Baltimore, MD, May, 1998.
- "Management of Parkinson's Disease." St. Agnes Hospital, Baltimore, MD, May, 1998.
- "Management of Alzheimer's Disease." Grand Rounds, Harbor Hospital, Baltimore, MD, June, 1998.
- "Parkinson's Disease." Grand Rounds, Anne Arrundel Hospital, Annapolis, MD, June, 1998.
- "Atypical Parkinsonism." Grand Rounds, Christiana Hospital, Wilmington, DE, September, 1998.
- "Diagnosis and Management of Alzheimer's Disease." Fairfax Hospital, Fairfax, VA, November, 1998.
- "Parkinson's Disease." Grand Rounds, Hanover Hospital, Hanover, PA, January, 1999.
- "Management of Parkinson's Disease" Grand Rounds Mercy Medical Center, Baltimore, MD February 1999.
- "New Treatments for Parkinson's Disease" Grand Rounds, Harrisburg Hospital, Harrisburg, PA February 1999.
- "A Delivery System from Bacterial Toxins" Neurology Research Conference, Baltimore, MD, March 1999.
- "Therapy of Parkinson's Disease" Grand Rounds, Peninsula Regional Medical Center, Salisbury, MD July 1999.
- "Tremors – Evaluation and Treatment" Family Medicine Review Course, Ocean City, MD June 1999.
- "Parkinson's Disease Update: Temple University, Neuroscience Grand Rounds, Philadelphia, PA, March 2000.
- "Novel Neurotoxins for Dystonia" Baltimore Dystonia Support Group. April 2000.
- "Institutional Review Boards" Trial Builder Seminar, Baltimore, MD, June 2000, June 2001
- "Current Concept of Alzheimer's Disease" Medical Society of Delaware, December 2000.
- "Delivery Vectors from Tetanus Toxin". International Conference on Basic and Therapeutic Aspects of Botulinum and Tetanus Toxin, Orlando, FL, November 1999.
- "Current Therapies of Parkinson's Disease" Medical Society of Delaware, June 2000.
- "Update on Alzheimer's Disease" Peninsula Regional Medical Center, Salisbury, MD, February 2001.
- "Parkinson's Disease Management Update" University of Maryland CME Symposium April 2001.
- "Neurodegenerative Diseases – Shared Features and Mechanism" Program in Neuroscience Annual Symposium, Baltimore, Maryland, May 2001.
- "Diagnosis and Treatment of Alzheimer's Disease" Grand Rounds North Arundel Hospital, Glen Burnie, MD, January 2001.

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- “Immunologic Aspects of Treatment with Botulinum Toxin” Symposium Dystonia Medical Research Foundation, Baltimore, MD September 2001.
- “Update on Parkinson’s Disease” Symposium, Saint Joseph Medical Center, Baltimore, MD, March 2002
- “The Cause of PSP” Society for PSP, Baltimore, MD, September 2001.
- “Current Concepts of PSP” Society for PSP, National Symposium, Baltimore, MD, May 2002.
- “The Cause of Parkinson’s Disease” Johns Hopkins Parkinson’s Disease Symposium, Baltimore, MD, October 2002.
- “Common Features of Alzheimer’s Disease, Parkinson’s Diseases and ALS”. In the Movement Disorders Course of the 54<sup>th</sup> Annual Meeting of the American Academy of Neurology, Denver, CO May 2002.
- “Role of Parkin in Proteasomal Function” New York Academy of Sciences Symposium Parkinson’s Disease: Life Cycle of the Dopamine Neuron, Princeton, NJ, September 2002
- “Differential Diagnosis of Parkinsonism” in Parkinson’s Disease Update Symposium, University of Maryland, Ocean, City, MD, November 2002.
- “Clinical Uses of Botulinum Toxin” Family Medicine Review Course, University of Maryland, Ocean City, MD, June 2003.
- “Amyloid Toxicity in Alzheimer’s Disease”, in Mechanism of Neurodegeneration Course at 55<sup>th</sup> Annual Meeting of the American Academy of Neurology, Honolulu, HI May 2003.
- “Common Aspects of Neurodegenerative Disease”, Neurology Grand Rounds, University of Maryland, September 2003.
- “Neuroprotective Agents in Neurodegenerative Diseases” in John Whitakeer Memorial Symposium, Baltimore VAMC, September 2003.
- “Experimental Treatment for Parkinson’s Disease” Parkinson Disease Symposium, University of Maryland, October 2003.
- “Common Movement Disorders” Family Medicine Review Course University of Maryland, Ocean City, MD June 2004.
- “Amyloid and Alzheimer’s Disease” Neuroscience Grand Round. University of Alabama School of Medicine, Birmingham, AL June 2002.
- “Glutamate Toxicity in Neurodegenerative Diseases” Cooper University Hospital Grand Rounds, Philadelphia, PA, August 2004.
- “Update on PSP” Baltimore Chapter of the PSP Society, Baltimore, MD, September 2004.
- “Alzheimer’s Disease Strategies” Medical Crossfire, Baltimore, MD, November 2004.
- “Current Diagnosis of Dementia”, Grand Rounds Northwest Hospital, November 2004.
- “Current Treatment of Alzheimer’s Disease”, Grand Rounds, Mercy Medical Center, October 2004.
- “Amyloid Toxicity” and Oxidative Injury in AD, PD, and ALS” in Mechanism of Neurodegenerative Diseases seminar at the 56<sup>th</sup> Annual Meeting of American Academy of Neurology, May 2004.
- “Surgical Treatment of Parkinson’s Disease” 3<sup>rd</sup> Annual Movement Disorders Symposium, University of Maryland School of Medicine, November 2004.
- “Stem Cells for Neurodegenerative Diseases” Tech Council of Maryland, “Business of Stem Cell Research Conference” Bethesda, MD, May 2005.
- “Non-Alzheimer’s Dementias” Delaware Medical Society, December 2004.
- “Current State of Alzheimer’s Research” in Support of the Ronald Reagan Breakthrough Act, U.S. Senate News conference chaired by Senator Barbara Mikulski, Washington, DC, March 2005.



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- “Pathogenic Proteins” in Mechanism of Neurodegenerative Diseases Seminar, 57<sup>th</sup> Annual Meeting of the American Academy of Neurology, Miami, FL, April 2005.
- “Current Treatment of Alzheimer’s Disease” Grand Rounds, Upper Chesapeake, Medical Center, Bel Air, Maryland, May 2005.
- “Management of Alzheimer’s Disease”, 5<sup>th</sup> Annual Update in Internal Medicine, Baltimore, MD June 2005.
- “Parkinson’s Disease and Related Syndromes” Contemporary Issues in Neurology Symposium, Jersey Shore University Medical Center, September 2005
- “Regenerative Medicine”, State of Maryland Senate Budget and Taxation Committee, September 2005
- “Surgical Therapies for Parkinson’s Disease” Giannaris-University of Maryland Patient Symposium, Hagerstown, MD, October 2005
- “Restless Leg Syndrome” Maryland Academy of Physicians Assistants” October 2005
- “Current Research in Alzheimer’s Disease” , Association Alzheimer’s, Ocean City , MD, November 2005
- “Cellular Therapies for Neurological Diseases” Medical School Council of the University of Maryland School of Medicine, November 2005
- “PSP Research Update” Baltimore-Washington Regional Family Conference on Progressive Supranuclear Palsy, November 2005
- “Neurotoxin Therapeutics Beyond Botox” Neurology Grand Rounds, North Shore-Long Island Jewish Medical Center, New Hyde Park, NY, November 2005
- “Neuroprotective Therapy for Parkinson’s Disease” 4<sup>th</sup> Annual Movement Disorders Symposium” University of Maryland School of Medicine, December 2005
- “Current Treatment of Alzheimer’s Disease” Grand Rounds, Franklin Square Medical Center, Baltimore MD, December 2005
- “Treatment of Spasticity with Botulinum Neurotoxin” VA MS Center of Excellence-East Symposium, Baltimore MD. April 2006
- “Stem Cells for Neurological Diseases” Neurology Grand Rounds, University of Maryland School of Medicine, April 2006
- “Developing Neurological Therapeutics from Tetanus Toxin” Keynote Speaker, Research Day, Baltimore VAMC, April 2006
- “Pathogenic Proteins” in Mechanism of Neurodegenerative Diseases Seminar, 58<sup>th</sup> Annual Meeting of the American Academy of Neurology, San Diego CA, April 2006.
- “Surgical Therapies for Parkinson’s Disease” APDA-University of Maryland Patient Symposium, Bethesda, MD, May 2006
- “Management of Dementia”, Delaware Medical Society, July 2006
- “Recent Progress in Alzheimer’s Disease” Alzheimer’s Association of Greater Maryland, November 2006
- “Tetanus Toxin as a Neurological Therapeutic” Allergan Corporation, Irvine CA, March 2007
- “Neuroprotection for Parkinson’s Disease” in Developing Neuroprotective Therapies Seminar (Course Director PS Fishman), 59<sup>th</sup> Annual Meeting of the American Academy of Neurology, Boston MA, April 2007
- “Transcription Factor Driven Differentiation of Neural Stem Cells” 1st Annual Stem Cell Symposium, University of Maryland School of Medicine, May 2007
- “Surgical Interventions: Deep Brain Stimulation and Future Stem Cell Therapy”, Parkinson’s Matters Symposium, Baltimore MD, June 2007

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- “Stem Cells for Neurological Diseases” Neurology Grand Rounds, North Shore-Long Island Jewish Medical Center, New Hyde Park, NY, October 2007
- “Diagnosis and Treatment of Alzheimer’s Disease” Grand Rounds, Saint Agnes Medical Center, Baltimore MD, September 2007
- “Delivery Vectors Derived from Tetanus Toxin” NIH Workshop on Delivery of Gene Therapy to the CNS, Washington, DC, November 2007
- “Bringing New Neurologic Therapies to Marylanders” Maryland State Legislature, Annapolis, MD, January 2008
- “Neuroprotection for Parkinson’s Disease” in Developing Neuroprotective Therapies Seminar (Course Director PS Fishman), 60<sup>th</sup> Annual Meeting of the American Academy of Neurology, Boston MA, April 200
- “Disease Modifying Therapy for Alzheimer’s Disease” in Developing Neuroprotective Therapies Seminar (Course Director PS Fishman), 60<sup>th</sup> Annual Meeting of the American Academy of Neurology, Boston MA, April 2008
- “Atypical Parkinsonism” Grand Rounds, York Hospital, York PA, May 2008
- “Diagnosis and Treatment of Parkinson’s Disease” Department of Family Medicine Annual Review Course, Ocean City, MD, June 2008
- “Management of Parkinson’s Disease” Grand Rounds, Harbor Hospital, Baltimore MD, August 2008
- “Moving Toward a Cure of Parkinson’s Disease” Wellspan Neurology Patient Symposium, New Oxford, PA, September 2008
- “Tetanus Toxin” Neurology Grand Rounds, Yale University School of Medicine, New Haven, CT, October 2008
- “Surgical Treatments for Parkinson’s Disease”, APDA/University of Maryland Medical Center “Parkinson’s Matters” Symposium, Elkridge MD, November 2008.
- “Transcription Factor Directed Differentiation of Neural Progenitor Cells”, 1<sup>st</sup> Maryland Stem Cell Research Symposium, Columbia MD, December 2008
- “Diagnosis and Management of Dementia”, Grand Rounds, Frederick Memorial Hospital, Frederick MD, January 2009
- “Parkinson’s Disease: Cause, Diagnosis and Treatment Strategies”, 21<sup>st</sup> Geriatric Symposium, Salisbury MD, May 2009
- “Transcription Factor Driven Neuronal Differentiation of Stem Cells”, Center for Vascular Disease, University of Maryland, May 2009
- “Diagnosis and Treatment of Parkinson’s Disease” Grand Rounds, Saint Joseph’s Hospital, Baltimore, MD, June 2009
- “What is PSP”, “Good Morning Maryland”, WMAR TV Baltimore, MD, July, 2009
- “Stem Cell Strategies for Repair of Damaged Brain” Department of Chemical and Biomolecular Engineering, Johns Hopkins University, Baltimore, MD September 2009
- “Cell Penetrating Peptide-ND2 Directed Differentiation of Neural Progenitor Cells”, World Stem Cell Summit, Baltimore MD, September 2009
- “Interventions: Today and Tomorrow”. APDA/University of Maryland Medical Center “Parkinson’s Matters” Symposium, Elkridge, MD, October 2009.
- Moderator, Clinical Session: Interagency Botulism Research Coordinating Committee Meeting, Alexandria VA, October 2009
- “Current Research” Parkinson’s Foundation of the National Capitol Area Symposium. Falls Church VA, November 2009



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- “Following the Botox Trail with Tetanus Toxin: from Pathogen to Therapeutic” Neurology Grand Rounds, University of Maryland School of Medicine, January 2010
- “Toxins as Therapy” featured in VA Research Currents, January 2010
- “Pathogenic and Therapeutic Aspects of Tetanus Toxin” List Biological Laboratories” Campbell CA, March 2010
- “Changing Concepts of Parkinson’s Disease” APDA Support Group, Severna Park MD, May 2010
- “Non-Alzheimer’s Dementia”, University of Maryland “Town and Gown” Neurology Symposium, Baltimore MD, June 2010
- “Differentiation of Neural Progenitor Cells with the Transcription factor ND2” 3<sup>rd</sup> Annual Maryland Stem Cell Research Symposium, Gaithersburg MD, September 2010
- “Surgical Management of Parkinson’s Disease”, Neurosurgery Grand Rounds, University of Maryland School of Medicine, October 2010
- “Understanding Alzheimer’s Disease” Temple Beth-El, Baltimore MD, October 2010
- “Current and Experimental Surgery for Parkinson’s Disease” APDA/University of Maryland Medical Center “Parkinson’s Matters” Symposium, Elkridge MD, October 2010.
- “Research Progress in Parkinson’s Disease” Delmarva Parkinson’s Disease Symposium, Lewes DE, November 2010
- “New Concepts in Parkinson’s Disease” Capital Area Parkinson’s Disease Group. Washington DC, December 2010
- “Synergy of VA and University in Neurology” Neurology Faculty Retreat Jan. 2011
- “Animal Research at the Baltimore VAMC” VA Research Retreat, Baltimore MD, March 2011
- “Diagnosis and Management of Alzheimer’s Disease” Grand Rounds, Peninsula Regional Medical Center, Salisbury MD, May 2011
- “Neurodegenerative Diseases: Dementias and Movement Disorders” FDA Educational Program (CIDER) White Oak MD June 2011
- “On the Road to a Cure for Parkinson’s Disease: Are We There Yet?” APDA/University of Maryland Medical Center “Parkinson’s Matters” Symposium, Columbia MD, October 2011.
- “Disease Modifying Therapy for Neurodegenerative Diseases: Lost in Translation” Neurology Grand Rounds, University of Maryland School of Medicine, December 2011
- “Synucleinopathies from Bench to Bedside” World Conference on Parkinson’s Disease, Shanghai China, December 2011
- “Psychogenic Movement Disorders” World Conference on Parkinson’s Disease, Shanghai China, December 2011
- “Biologic Therapies to Improve Nervous System Function” National Meeting of VA Rehabilitation Centers of Excellence and REAPs” Washington DC, April 2012
- “Parkinson’s Disease Q&A” APDA Support Group, Severna Park Maryland, April 2012
- “Current Status of Treatment and Research in Parkinson’s Disease” APDA Support Group, Silver Spring Maryland, May 2012
- “Difficulties in Translational Research: Lessons from Neurodegenerative Disease” VA MS Center of Excellence East, Baltimore MD, May 2012
- “Dystonia”, WCBM Radio, Baltimore MD, June 2012
- “Chemodenervation: Scientific and Practical Aspects” 6<sup>th</sup> Annual Johns Hopkins Symposium and Practicum on Dystonia and Spasticity. Baltimore MD, September 2012
- “Cutting Edge Research in Parkinson’s Disease” APDA/University of Maryland Medical Center “Parkinson’s Matters” Symposium, Columbia MD, October 2012.
- “Parkinson’s Disease Research Update” APDA Capital Chapter, Washington DC, October 2012

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- “Medical and Surgical Treatment for Movement Disorders” University of Maryland Health Seminar, Baltimore MD, November 2012
- “Movement Disorders Update” 5<sup>th</sup> International Conference of the Jordanian Neurological Society, Amman Jordan, November 2012
- “Navigating the Crowded Field of Neurotoxins: From Chaos to Clarity” CME Webcast, November 2012
- “Developing Novel Therapeutics from Clostridial Neurotoxins” Neurology Research Rounds, Baltimore MD, January 2013
- “Alzheimer’s Disease”, Maryland Public Television, Owings Mills MD, January 2013
- “The Legacy of William J. Weiner M.D.” University of Maryland, Baltimore MD, March 2013
- “Developing Therapeutics from Clostridial Neurotoxins” 11<sup>th</sup> Annual Center for Biomedical Engineering and Technology Retreat, Baltimore MD, April, 2013
- “Medical and Surgical Treatment for Parkinson’s Disease: Pros and Cons” University of Maryland Health Seminar, Annapolis MD, May 2013
- “Abnormalities in Body Posture in Parkinson’s Disease” William J. Weiner Town and Gown Update XII, Baltimore MD, June 2013
- “Promotions and Tenure at the School of Medicine” BIRCWH Scholars Program, University of Maryland School of Medicine, Baltimore, MD, September 2013
- “Dystonia: ” 6<sup>th</sup> Annual Johns Hopkins Symposium and Practicum on Dystonia and Spasticity. Baltimore MD, October 2013
- Co-Chair, Clinical Session: 50<sup>th</sup> Annual Interagency Botulism Research Coordinating Committee Meeting, Annapolis MD, October 2013
- “Surgical Treatment for Movement Disorders” University of Maryland Health Seminar, Frederick MD, November 2013
- “The Role of Basic Research in a Department of Neurology”, Department of Neurology Annual Retreat, December 2013
- “Surgical Treatment of Parkinson’s Disease” APDA/University of Maryland Medical Center “Parkinson’s Matters” Symposium, Linthicum MD, March 2014.
- “Surgical Treatment for ET and Parkinson’s disease” University of Maryland Health Seminar, Belcamp MD, April 2014
- “Surgical Treatment for Movement Disorders” University of Maryland Health Seminar, Cambridge MD, October 2014
- “Delivering Molecular and Cellular Therapies to the Brain” Neurology Research Faculty Meeting, Baltimore MD, November 2014
- “Minimally Invasive Brain Intervention: What’s All the FUS About?” Neurology Grand Rounds, University of Maryland School of Medicine, March 2015
- “It’s a Wire” APDA/University of Maryland Medical Center “Within Our Reach” Symposium, Linthicum MD, May 2015.
- “Surgical Management of Parkinson’s Disease” APDA/University of Maryland Medical Center “Within Our Reach” Symposium, Linthicum MD, May 2015.
- “Diagnosis and Management of Demetria and Alzheimer’s Disease” Grand Rounds, Union Memorial Hospital, Baltimore MD, May 2015
- “Delivering Cellular/Molecular Therapies to the Brain” First Annual VA Research Week Symposium, Tampa, Florida, May 2015
- “Nuclear Medicine Imaging in the Diagnosis and Management of Dementia” Annual Meeting of the Society for Nuclear Medicine and Molecular Imaging, Baltimore MD, June 2015
- “Alzheimer’s Disease: Science and Treatment” Focused Ultrasound for Alzheimer’s Workshop,

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- Bethesda, MD September 2015
- “The First Pallidotomy for Parkinson’s disease using FUS” WNBC TV September 2015  
Washington DC
- “Treatment for Parkinson’s Could Replace Surgery” Baltimore Sun (page 1) September 2015
- “Diagnosis and Management of Parkinson’s disease” Grand Rounds, Union Memorial Hospital,  
Baltimore MD, March 2016
- “ABCs of Parkinson’s Disease” Parkinson’s Foundation of the National Capital Area Annual  
Symposium, Falls Church VA, March 2016
- “Therapeutic Ultrasound to the Brain: What’s All the FUS About” Brain Research Consortium,  
University of Maryland School of Medicine, March 2016
- “Medical and Surgical therapy of Dose Fluctuations in Parkinson’s Disease APDA/University of  
Maryland Medical Center “Within Our Reach” Symposium, Linthicum MD, April 2016.
- “Diagnosis and Treatment of Parkinson’s disease” Grand Rounds, Greater Baltimore Medical  
Center, Baltimore MD, April 2016
- “Therapeutic Ultrasound for Movement Disorders” 10<sup>th</sup> Weiner Memorial Symposium, University  
of Maryland School of Medicine, May 2016
- “Focused Ultrasound for Parkinson’s Disease” Center for Neuromodulation , Ohio State  
University School of Medicine, Columbus Ohio , May 2016
- “Patient Evaluation During Focused Ultrasound Treatment” Insightec International Users  
Meeting, Chicago IL, June 2016
- “A Role for Focused Ultrasound in the Treatment of Parkinson’s Disease” FUS Foundation  
Webinar, Charlottesville VA, July 2016
- “Enhancing FUS Mediated Stem Cell Delivery to the Brain” FUS International Symposium,  
Bethesda MD” August 2016
- “FUS in the Treatment of Movement Disorders” Panelist, FUS International Symposium,  
Bethesda MD” August 2016
- “FUS Mediated Opening of the Blood-Brain Barrier: Current and Future Goals” FUS  
International Symposium, Bethesda MD” August 2016
- “Therapeutic Ultrasound for Movement Disorders” Delaware Valley Movement Disorder Society,  
Philadelphia PA, August 2016
- “Minimally Invasive Brain Intervention: What’s All the FUS About” Neurology Grand Rounds,  
Drexel University School of Medicine, Philadelphia PA, August 2016
- “FUS Thalamotomy for Essential Tremor” Maryland/DC Movement Disorder Society, Columbia  
MD, January 2017
- “New Treatment Options for Essential Tremor” Hopenet Support Group, Columbia MD,  
February 2017
- “Feasibility of FUS Mediated Pallidotomy for Parkinson’s Disease” Insightec Investigator’s  
Meeting, Miami FLA, February 2017
- “Parkinson’s Disease and Deep Brain Stimulation” Park School, Brooklandville MD April, 2017
- “A Randomized Trial of Focused Ultrasound Thalamotomy for Essential Tremor”. Top Ten  
Translational Science Award Winner, Clinical Research Forum, Translational Science 2017,  
Washington DC 2017
- “Is Focused Ultrasound Better than Deep Brain Stimulation: Yes”. Controversies in Neurology  
Plenary Session, Annual Meeting of the American Academy of Neurology , Boston MA,  
April 2017
- “Surgical Therapy of Parkinson’s Disease APDA/University of Maryland Medical Center “Within  
Our Reach” Symposium, Linthicum MD, May 2017.

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“New Treatment for Essential Tremor” International Essential Tremor Foundation, Webinar  
June 2017  
“Focused Ultrasound Treatment” Direct Connections, Maryland Public Television, Owings Mills  
MD July 2017  
“You Asked: How Can I Spot Early Signs of Dementia In an Aging Parent?” in TIME Health by  
Makham Heid October 17  
“Was a spy’s Parkinson’s disease caused by a secret microwave weapon attack” in Washington  
Post by Ira Shapira December 2017  
“Patient Selection for FUS Mediated Pallidotomy” InSightec Investigator’s Meeting, Toronto,  
Ontario, January 2018.  
“Minimally Invasive Surgery for Movement Disorders” Neurology Education Network, Silver  
Spring MD, February 2018  
“Enhancing Gene and Cellular Therapy for Neurodegenerative Diseases with FUS”. 21<sup>st</sup> US-Japan  
Gene and Cellular Therapy Conference, FDA, Silver Spring MD, March 2018  
“Recent Progress in Alzheimer’s Disease” Direct Connections, Maryland Public Television,  
Owings Mills MD March 12, 2018  
“Focused Ultrasound for Movement Disorders” 9<sup>th</sup> Annuli Medical Imaging Technology  
Showcase” April 2018, Washington DC  
“DBS Programming and Management” Parkinson’s Foundation of the National Capital Area  
Annual Symposium, Owings Mills MD, April, 2018  
“Parkinson’s Disease Q&A Panel” APDA/University of Maryland Medical Center “Within Our  
Reach” Symposium, Linthicum MD, April 2018.